

Johan Vilhelm Snellman's–Finnish Philosopher, Writer, Diplomat–Statement “Science Centers for All”

Abdullah Aydın¹

¹ Department of Science Education, Faculty of Education, Kırşehir Ahi Evran University, Kırşehir, Turkey

Correspondence: Abdullah Aydın, Department of Science Education, Faculty of Education, Kırşehir Ahi Evran University, Kırşehir, Turkey.

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Abstract

“Go to temples of science and ideas of Europe. Imitate the Tugendbund, ‘the Union of Virtue’, of which thousands of German youth are the members. Always keep the rule of ‘Fit soul is in fit body’ in mind” (Petrov, 2013, p. 72). This study aimed to show the similarities, in terms of expression, emphasis, and implication, in the about/mission/vision/goals/objectives of various science centers from around the world and in the basic themes derived from Snellman’s statement above, namely, Science for all, Science Centers for all, and Human welfare that he made as a challenge to not only his people but to everyone. Document and content analyses were applied in the study. Within the scope of these analyses, this study investigated the about/mission/vision/goals/objectives sections of websites of science centers from around the world (Asia, Europe, Global, Latin America/The Caribbean, North America, Africa). From this investigation, similar basic themes, derived from Snellman’s statement challenging his people/everyone to adopt this devotion to science, were found in the areas of i) expression in ASTC, CIMUSET/CSTM, CASC and SAASTEC; ii) emphasis in ECSITE, ASDC, ASCN and NSCF; and iii) implication in ASPAC, ASTEN, NCSM, ABCMC and Red-POP. These basic themes, as found in the about/mission/vision/goals/objectives of science centers, can, in effect, be narrowed down to the one theme of “cultural institutions will be a big part of human life” (Madsen 2017, p. 68) science centers in the global village (Touraine, 2016, p. 121) of the future.

Keywords: Johan Vilhelm Snellman, science for all, science centers for all, human welfare, similarities, science education

1. Introduction

According to Fyodor Dostoyevsky, “*Man is a very deep being*” (BirthdayWishes.expert, 2018; Dostoyevski, 2019, p. 51). Rothacker expanded upon this conception of human beings, saying. “*It is clear that human beings are entities that constantly transcend themselves. They have always been forced to go beyond their capabilities. It is also clear that philosophy always undertakes the responsibility of transcendence and performs this by leaving behind previously contrived dogmatism*” (Rothacker, 2008, p. 48). According to Sartre, “*Many scientists are essentially inventors or technicians who avoid philosophy; yet, none of them have grown up in a philosophical void*” (Sartre, 2010, p. 19). In this growing up process, “*It is important to seek and maintain the inconvenient truth that previous generations possessed in the sciences* (Goethe, 2014, p. 80) According to Paulo Coelho’s understanding of the truth “*it is a king, a wise king*” (Coelho, 1996, p. 80). “*The direct purpose*” of this king is “*life*” (Montaigne, 2012, p. 38). This life, according to Bertrand Russell, is that “*the truth in science is just a moment*” (Demiralp, 2013, p. 29).

To Omar Hayyam, this moment means “*I cannot make myself upset with the past and the future*” (Hayyam, 2010, p. 26), while William Shakespeare describes it as “*To make a special moment much more special and gladsome*” (Shakespeare, 2014, p. 62). This moment, as Kafka states, is that “*the truth cannot be split into pieces*” (Kafka, 2015, p. 79) “*One should choose this form/truth according to their own soul*” (Gorki, 2014, p. 159). This choice assumes that there is “*full awareness of the work*” (Hacıp, 2011, p. 126), a “work” which Rûmî says “*You should know a little bit about what lies behind it*” (Rumi, 2005, p. 258). This knowing is “*Feeling a sense of greater depth and more passionate every passing year*” (Woolf, 2014, p. 222). This feeling rests on the idea that “*Very small things can make people happy*” (Rubin, 2010, p. 356). In this happiness “*each word of it is a picture*” (Arif, 2016, p. 179). This picture means “*They realized that the possibilities in question cannot be underestimated*” (Kafka,

2013, p. 85), while the realization is “*This thing is the magic word, this is inculcation*” (Freud, 2014, p. 31). This inculcation is in the form of “*I challenge you!*” (Balzac, 2016, p. 302). The challenge is “*but it is necessary to wait... a long time*” (Ali, 2016, p. 254). This waiting is “*at a moment with an idea*” (Attar, 2016, p. 341). At this moment, “*the real thing will come closer to realization*” (Fairbanks, 2013, p. 184). This realization is “*This was not going to be that hard*” (Tamaro, 2016, p. 91). However, what is difficult is that “*None of us has been granted the privilege of having absolute truth*” (Adler, 2014, p. 238). About this truth, it is written, “*How noble his logic is! How infinite his feelings! How Godly his thoughts are!*” (Shakespeare, 2016, p. 238). The noble one emphasized—eternal—like God, is “*Why not?*” (Hemingway, 2016, p. 129) The place where the stated realization is, in other words, the place of the moment pointed out by Russell above, “*is called memory*” (Cornford, 2010, p. 225). In this place, that is, when we want to recall “*the thoughts that appear in our memory*” (Cornford, 2010, p. 78), or something “*we understand in our memories, we keep the wax under the clear influence of perceptions or thoughts, and we put the stamp on the candle as we can stamp the seal ring. We remember and know the thing which was stamped in this way as long it remains as an image. We forget and do not know those that were deleted or failed to leave a stamp*” (Cornford, 2010, pp. 225-226).

According to George Berkeley, at the moment mentioned above, “*the scream of the whole/truth*” leaves an image (Goodreads, 2019). Plato describes this scream, saying “*true thought is knowledge*” (YourStory, 2017; Cevizci, 2010, p. 132; Platon, 2019, p. 38). The highlighted idea, according to Francis Bacon, is that “*Knowledge itself is a power*” (Kearnes, 2008, p. 99; Bacon, 2019, p. 192). The places where this power is shown are science centers, that is, *mental shopping centers* (Ortaylı, 2015).

When we look at science centers through the “*Archeology of Knowledge*” (Foucault, 2011, pp. 177-185, 200-221, 246), or “*their past*” as İlber Ortaylı puts it (Ortaylı, 2015), it is possible to see philosophers - wise persons-politicians who have seen these places, lived there, left traces and were associated with the path itself. However, there are only a few individual(s) with these three qualities (philosopher - wise - politician). According to Victor Hugo, this trace(s) should be “*Don't tell me about the rain but you become rain!*” (Akın, 2016). Metaphorically speaking, it should precipitate and the product(s) of this precipitation should be seen. Johan Vilhelm Snellman, the Finnish philosopher-writer-diplomat, is one of those who rained.

This study investigated how Snellman rained on the global village (Touraine, 2016, p. 121) and what his harvest has been. This rainfall is represented by the *first* words that he used to encourage his people/everyone: “*Go to temples of science and ideas of Europe. Imitate the Tugendbund, 'the Union of Virtue', of which thousands of German youth are members. Always keep the rule of 'Fit soul is in fit body' in mind*” (Petrov, 2013, p. 72).

These words have passed down, enlarging like snowballs, from the past to the present among Finnish youth. The clue demonstrating this enlargement can be seen in Snellman's statement: “*O Finnish youth! Your duty is not to send the ball flying high with a kick of the foot, but to increase the dignity and honor of the Finnish nation, to advance our beloved homeland in all areas, to increase the prosperity and happiness in all parts of it*” (Petrov, 2013, p. 72).

It is important to look for clues as to whether the main themes derived from Snellman's *first* statement above have served as guides to other nations' science centers. In this study, these clues were searched for in the about/mission/vision/goals/objectives sections of the websites associated with over 3000 science centers' (Çolakoğlu, 2017) and visited by more than 300 million visitors (Çolakoğlu, 2017) every year. In all of the websites of the science centers, the common theme identified was, as Francis Bacon put it, “*knowledge itself is power*” (Kearnes, 2008, p. 99; Bacon, 2019, p. 192).

1.1 Knowledge

Although widely used in daily life, information is a difficult concept to define” (Özenç-Uçak, 2010, p. 705). As a concept, information refers to “*the data of scientific research and is an element to make human life easier and to produce new technological products and new technologies*” (Engin, 2005, p. 427). This element is “*one of the most basic elements of life and shapes the life of every living thing*” (Keseroğlu, 2010, p. 685) and “*means apprehending something as something*” (Topdemir, 2009, p. 126). This suggests that “*knowledge is not a transferable commodity, and learning is mainly identified with the activity of the construction of personal meaning*” (Cardellini, 2006, p. 177).

1.2 Science

The sciences “*are actually summaries of life, which generalize and reconcile internal and external experiences*” (Goethe, 2014, p. 91). The summary mentioned here means “*discursive formations are not science*” (Foucault, 2011, p. 229). “*Science or something that thinks of itself as science takes its place in a field of knowledge and plays*

a role there.” (Foucault, 2011, p. 233). This role is that *“it has a special relationship between science and knowledge”* (Foucault, 2011, p. 233). This relationship is *“science is involved as an element of knowledge”* (Foucault, 2011, p. 233). This involvement means that *“a necessary crisis should occur when information reaches maturity and becomes science, because there is a distinction between those who show what is individual as separate and those who do not overlook the general but want to include what is particular as well”* (Goethe, 2014, p. 81). The products of the maturity mentioned are exhibited in science centers.

1.3 Science Centers

Science centers, which are important elements of extracurricular education, make an important contribution to education and training in their locations (Çolakoğlu, 2017). Today, this contribution is realized by questioning the educational environments according to their structural, social and educational characteristics (Çığrık, 2016). In Finland, this questioning led to a program change in 2016, which resulted in changes to classroom environments that were accepted as educational innovations (Çığrık, 2016).

This study aimed to identify the history of the ideas that led to the above-mentioned innovations in education. The foundation for these ideas was laid by Johan Vilhelm Snellman, a Finnish philosopher-writer-diplomat, who made the above-mentioned statement encouraging his people/everyone. It is clear in today’s Finland, as it was in the past, that this statement has been taken as a guide, contributing to the adoption of the understanding that education is not limited to the classroom and school and of the necessity of visiting environments outside of learning (i.e. the temples of science and ideas, as Snellman noted). The idea is the *“necessity that learning environments outside of school settings be included in education as a specific program”* (Çığrık, 2016, p. 80). This necessity is *“tripartite, meaning the learning area includes daily life, school and out of school areas”* (Çığrık, 2016, p. 80).

1.4 Conceptual Framework

“If ancestors accumulate goodness and virtue, future generations will benefit from them.” (Carter, 2014, p. 65) This virtue, according to Farabi, is *“science is the greatest virtue”* (Germann, 2016; Farabi, 2019, p. XXIV). According to Victor Hugo, it means *“the size of a nation is not determined by the large size of its population but rather, by the number of intelligent and virtuous men”* (Göksu, 2017, p. 53). The clue regarding this number, according to David Lloyd George, is, *“A person’s size is measured by looking him up from his chin”* (Sarı, 2017, p. 484). This measurement, according to William Blake, is *“to be able to see the world in a grain of sand”* (Von Foerster, 1984, p. 225). Victor Hugo says that this place *“can be seen through philosophy, which is the microscope of thought”* (Krieger, 2007, p. 103). However, while information is invisible, it is nonetheless one of the fundamental parts of the universe (Durer, 2016).

This part mentioned is *“when a person conveys its pieces to another person, it is called teaching; when another person receives them from this person it is called learning; and when this person holds them in the sense of possession, it is called knowing”* (Cornford, 2010, p. 248). This knowing, according to Montaigne, is *“I leave myself unaware and unconcerned to the general law of the world in this university called the universe; if I feel this law in me, I am considered to have enough knowledge”* (Montaigne, 2012, p. 48).

The places where the indicated pieces of information are transferred, received and owned effectively are science centers; in other words, mental shopping centers. The emphasis on *‘science for all’*, in terms of what is exhibited in these shopping centers, is a requirement. In other words, there is a need for everyone to visit the common heritage of mankind – science - and the places where it is displayed - the scientific temples, as Snellman calls them.

1.5 Problem Case

Books *“have an important quality that constitutes a model for life, knowledge, hope, desire and new ideas in today’s complex world”* (Kasten & Yıldırım, 2011, p. V). These qualities are human needs. These needs, as Bertrand Russell puts in, are *“the majority of minds always turn instinctively to the real need of the moment”* (Russell, 2016, p. 45). According to Russell, this turning is *“to stimulate the creative impulses towards art and science”* (Russell, 2016, p. 45). Arthur Schopenhauer states that the opposite impulses are *“internal causes”* (Schopenhauer, 2012, p. 30). These reasons, according to Nietzsche are that *“life lacks an eye, a mind, but that does not mean that it is blind and stupid; it has its own eyes and consciousness”* (cited Schopenhauer, 2012, p. 30). The life pointed to has a law. To Foucault, this law is *“always beyond existence”* (Foucault, 2011, p. 193). This *“beyond”* is *“existence cannot completely surround it; it changes, transforms, escapes from itself to its continuity”* (Foucault, 2011, p. 193). The impulses expressed by Russell above are *“almost all the progress in the world from the earliest times is attributable to science and the scientific temper”* (Russell, 2016, p. 93). The places where this temperament is exhibited are science centers. While this temperament is exhibited, it is important to emphasize human welfare and to know these philosophers - wise persons - politicians who lead the way to prosperity, and to

convey these figures to future generations. This importance, according to Dostoyevsky, is to bring to light the words of the “*human being, who is a very deep being*” (BirthdayWishes.expert, 2018; Dostoyevski, 2019, p. 51), who deeply sows, grows, ripens and then spreads to humanity. One of the deep figures pointed out is Johan Vilhelm Snellman, the Finnish philosopher-writer-diplomat.

1.6 Purpose of the Study

This study investigated the similarities, in terms of *expression*, *emphasis*, and *implication*, in the about/mission/vision/goals/objectives of websites of science centers in various regions of the world (Asia, Europe, Global, Latin America/The Caribbean, North America, Africa), regarding the basic themes of Snellman words encouraging his people/everyone. For this purpose, the answers to the following questions were sought.

- 1) Are there similarities between Snellman’s basic themes derived from the above-mentioned statement encouraging his people/everyone and the themes derived from the about/mission/vision/goals/objectives of websites of science centers in the mentioned regions in terms of *expression*?
- 2) Are there similarities between Snellman’s basic themes derived from the above-mentioned statement encouraging his people/everyone and the themes derived from the about/mission/vision/goals/objectives of websites of the science centers in the mentioned regions in terms of *emphasis*?
- 3) Are there similarities between Snellman’s basic themes derived from the above-mentioned statement encouraging his people/everyone and the themes derived from the about/mission/vision/goals/objectives of websites of the science centers in the mentioned regions in terms of *implication*?

2. Method

Document and content analyses were used in the study. Document analysis is used to reveal perceptions and events in a realistic and holistic way in the natural environment and involves the use of descriptive analyses (Yıldırım & Şimşek, 2008). In this study, the expressions published and shared in the about/mission/vision/goals/objectives in the websites of science centers (Science Center Networks [SCN], 2019) in various parts of the world were analyzed using the related methods. Content analysis refers to “*scientific analysis of the message*” (Barcus 1959, p. 72). With this, Snellman’s statement presented in Appendix A was analyzed and the basic themes derived from that statement were examined.

2.1 Sample of the Study

The sample of the study consisted of selected science centers in various parts of the world, which are given in the websites of science centers. These centers are all around the world (Asia, Europe, Global, Latin America/Caribbean, North America, Africa) (SCN, 2019).

2.2 Data Sources

The statements published in the about/mission/vision/goals/objectives parts of the websites of the selected science centers (SCN, 2019), which are presented in the websites of science centers (SCN, 2019), were used as the source of data.

2.3 Data Collection Tool

The basic themes (Annex 1) derived from Snellman’s statement encouraging his people/everyone and the similarities (Appendix B) were used as data collection tools. Codes were used to organize the basic themes in Appendix A and Appendix B. Coding “*is a tool used only to extract themes from the data*” (Robson, 2017, p. 554). This tool/code(s)/keyword(s) were symbolized as X, Y, Z. Of these, X was composed of codes X1-6; Y was composed of codes Y1-6 and Z was composed of codes Z1-6. The codes X1, Y1-4, and Z1-2 correspond to the theme of *Science for all*; codes X2-4 and Y5-6 correspond to the theme of *Science centers for all* and codes X5-6 and Z3-6 correspond to the theme of *Human welfare*. The basic theme similarity equivalents of these codes were X: *expression*, Y: *emphasis*, and Z: *implication*.

2.4 Data Analysis

Content analysis was used in the evaluation of the data related to the basic themes. This type of analysis refers to “*scientific analysis of the message*” (Barcus, 1959, p. 72). Snellman’s statement given in Appendix A was analyzed using this method, and basic themes related to it were determined. Next, the relevant literature regarding basic themes (ASPAC, 2019; ASTEN, 2018; NCSM, 1978; ECSITE, 1989; ASDC, 2018; ASCN, 2019; NSCF, 1987.; ASTC, 2019; CIMUSET/CSTM, 2017; ABCMC, 1999; Red-POP, 2015; CASC, 1985; SAASTEC, 1973) were reviewed, and the keywords corresponding to the similarities (*expression*, *emphasis*, *implication*) were specified. Taking into consideration the basic themes and related words/codes, some of the science centers’ (SCN, 2019)

about/mission/vision/goals/objectives that were published and shared on their websites (SCN, 2019) were investigated and analyzed. These investigations were conducted based on the basic themes shown in Appendix A and Appendix B and in the texts published in the aforementioned parts of the science centers' (SCN, 2019) websites, in terms of the similarity of the keywords/codes correlated to *expression*, *emphasis*, *implications*. The related texts “*all information and data needed*” were retrieved from the web address (SCN, 2019) and “*were epistemologically analyzed*” (Turgut, 2012, p. 239). In this study, “*Science for All, Science Centers for All, Human Welfare*” was determined as the main theme, and the similarity/code analysis of these keywords/codes related to these themes was conducted in terms of *expression*, *emphasis* and *implication*. Samples of this analysis are given in Appendix B.

2.5 Reliability of the Data Collection Tool

For the reliability of the above-mentioned analysis, key themes/expressions similar to the basic themes given in Appendix A and Appendix B in terms of *expression*, *emphasis*, and *implication* were determined, and then expert opinions (composed of 4 Science Education experts and one linguist) were taken regarding the analysis and translations (Saban & Ersoy, 2016). In order to ensure the reliability of the study, the points on which the 4 Science Education experts agreed or disagreed about the keywords/codes related to the similarities and aforementioned basic themes were determined. The formula below was used to calculate the reliability coefficient (Miles & Huberman, 1994):

$$\text{Reliability } (x) = \frac{\text{Agreement}}{\text{Agreement} + \text{Disagreement}} \times 100$$

The reliability coefficient for the basic themes and keywords/codes regarding similarities was calculated as 75%. The calculated values were found to be greater than the reliability coefficient (70%), which indicated that the keywords/codes related to the basic themes and similarities were reliable (Miles & Huberman, 1994).

2.6 Validity of the Data Collection Tool

The validity of the measurement tool is related to whether or not the researcher actually measures what he/she intends to measure without the intervening influence of other characteristics in order to determine if the research findings are consistent and meaningful in themselves and the results are credible (Başkale, 2016). The scope of the basic themes used in the content analysis of the research and the similarities of the keywords/codes can be claimed to exactly comply with the web pages and the literature and the purpose and problem of the study.

3. Results

The basic themes, namely *Science for All, Science Centers for All, Human Welfare*, were derived from the above-mentioned statement of Finnish philosopher-writer-diplomat Snellman. The similarities between these basic themes and the themes derived from the about/mission/vision/goals/objectives of the websites of science centers in various regions of the world (SCN, 2019) were determined in terms of *expression*, *emphasis*, and *implication*. These are given in the form of keyword/code similarities in the tables (Table 1, Table 2, Table 3, Table 4, Table 5, and Table 6).

Table 1. The similarity of the main themes derived from Snellman's statement in about/objectives parts of the websites of science centers in Asia region

Region	Science Centers	About/Objectives	Similarity/Code
	Asia Pacific Network of Science and Technology Centres (ASPAC)	About Us: "... the role and impact of science centres and museums in furthering the public understanding of science and technology" (Asia Pacific Network of Science and Technology Centres [ASPAC], 2019).	Z3
	Australasian Science and Technology Exhibitors Network (ASTEN)	The objectives of ASTEN are to: "... science and technology centres, museums and other organisations which utilise an interactive approach to further the public understanding of science and technology" (Australasian Science and Technology Exhibitors Network [ASTEN], 2018).	Z3
Asia		Main Objectives guiding the activities of NCSM are: "... science and technology and their applications in industry and human welfare, with a view to develop scientific attitude and temper and to create, inculcate and sustain a general awareness amongst the people (National Council of Science Museums [NCSM], 1978).	Z4
	National Council of Science Museums (NCSM)	... science and technology in cities, urban and rural areas for the benefit of students and for the common man by organizing exhibitions, seminars, popular lectures, science camps and various other programs (NCSM, 1978).	Z5
		...for science teachers/students/young entrepreneurs/technicians/handicapped/housewives and others on specific subjects of science, technology and industry" (NCSM, 1978).	Z6

Table 1 shows that in ASPAC's about part, one of ASTEN's goals (Z3) and three goals of NCSM (Z4, Z5, Z6) are similar to the main themes derived from Snellman's above-mentioned basic themes (*human welfare*) in terms of *implication*.

Table 2. The similarities regarding the main themes derived from Snellman's statement in the mission/vision/goals/aim parts of the websites of science centers in Europe

Region	Science Centers	Mission/Vision/Goals/Aim	Similarity/Code
Europe	European Collaborative for Science, Industry & Technology Exhibitions (ECSITE)	Mission: "... Its mission is to inspire and empower science centres, museums and all organisations that engage people with science, and to promote their actions. The network gathers more than 350 organisations in Europe and world-wide" (European Collaborative for Science, Industry & Technology Exhibitions [ECSITE], 1989).	Y1
		Our Vision: "Ecsite's vision is to foster creativity and critical thinking in European society, emboldening citizens to engage with science" (ECSITE, 1989).	Y2
	Association for Science and Discovery Centres (ASDC)	Our Vision: "...is a society where people are intrigued, inspired and involved with the sciences" (Association for Science and Discovery Centres [ASDC], 2018).	Y3
	Austrian Science Center Network (ASCN)	Über uns: Verein Science Center-Netzwerk "Wir haben ein klares Ziel –Wissenschaft soll für alle Menschen begreifbar, zugänglich und nutzbar sein. Wir sind überzeugt, dass dies ein wichtiger Beitrag zur Lösung der Herausforderungen und Bedürfnisse unserer Zeit ist" (Austrian Science Center Network [ASCN], 2019).	Y4
		Wir setzen dafür sogenannte Science-Center-Aktivitäten ein, die Wissenschaften und Technik für die Öffentlichkeit auf leicht zugängliche Weise erlebbar machen. Sie machen neugierig, wecken Freude am Forschen und kritischen Hinterfragen." (ASCN, 2019).	Y5
	Nordisk Science Center Forbund (NSCF)	About Us: The aim of Nordic Science Centre Association (NSCF): "...is to bring together the science centres in Scandinavia and the Baltic States, and to encourage cooperation and the exchange of ideas" (Nordisk Science Center Forbund [NSCF], 1987)	Y6

Table 2 shows that ECSITE's *missions* and *visions* (Y1, Y2), ASDC's *vision* (Y3), ASCN's *goals* (Y4, Y5) and NSCF's *aim* (Y6) are similar to the main themes derived from Snellman's above-mentioned basic themes (*Science for all*, *Science centers for all*) in terms of *emphasis*. In other words, the codes Y1, Y2, Y3, Y4 are similar to the theme of *Science for everyone*, and the codes Y5 and Y6 are similar to the theme of *Science centers for all* in terms of *emphasis*.

Table 3. The similarities regarding the main themes derived from Snellman's statement in the about part of the websites of science centers in the Global region

Region	Science Centers	About	Similarity/Code
Global	Association of Science-Technology Centers Incorporated (ASTC)	About Science Centers: "... Science centers give science a presence in the community and offer people of all ages and backgrounds the opportunity to ask questions, discuss, and explore....At science centers, everyone is welcome" (Association of Science-Technology Centers Incorporated [ASTC], 2019)	X2
		About CIMUSET/CSTM: "... to contemporary science centres, working primarily to popularize and promote science and technology among children and young people all over the world" (CIMUSET, n.d.)/"Visitors are invited to discover, play, and experience...." (Canada Science and Technology Museum [CSTM], 2017).	X3

According to Table 3, ASTC's *about* (X2) and CIMUSET/CSTM's (X3) *about* are similar to Snellman's basic

theme (*Science centers for everyone*) in terms of *expression*.

Table 4. The similarities regarding the main themes derived from Snellman's statement in the about/objectives parts of the websites of science centers in Latin America/The Caribbean

Region	Science Centers	About/Objectives	Similarity/Code
Latin America/ The Caribbean	Associação Brasileira de Centros e Museus de Ciência (ABCMC)	A ABCMC >> Sobre a ABCMC: “Fortalecendo, assim, sua importância para o desenvolvimento do país e contribuindo para uma percepção da ciência em todas as suas dimensões: fonte de prazer, de transformação da qualidade de vida e da relação entre os homens” (Associação Brasileira de Centros e Museus de Ciência [ABCMC], 1999).	Z1
	Red de Popularización de la Ciencia y la Tecnología para América Latina y el Caribe (Red-POP)	Objetivos de RedPOP: “Participar en las toma de decisiones relacionados con la popularización de la ciencia en los ámbitos nacionales, regionales e internacionales” (Ciencia y la Tecnología para América Latina y el Caribe [Red-POP], 2015).	Z2

When Table 4 is examined, ABCMC's *about* (Z1) and Red-POP's *goal* (Z2) are similar to Snellman's main theme (*Science for all*) in terms of *implication*.

Table 5. The similarities regarding the main themes derived from Snellman's statement and the about/mission parts of the websites of science centers in North America

Region	Science Centers	About/Mission	Similarity/Code
North America	Canadian Association of Science Centres (CASC)	Home/About Us: “CASC is a national platform for Canada's Science Centres and informal science engagement. Science Centres have relevance to all sectors of the population and have become important meeting places for science and society” (Canadian Association of Science Centres [CASC], 1985).	X4
		Mission: “The Canadian Association of Science Centres builds capacity for its members to inspire a creative and prosperous Canada through science and technology engagement” (CASC, 1985).	X5

According to Table 5, CASC's *about* (X4) and CASC's *mission* (X5) are similar to the themes derived from Snellman's statement (*Science centers for all, human welfare*) in terms of *expression*. In other words, the X4 code is similar to the theme *Science centers for all*, and the X5 code is similar to *human welfare* in terms of *expression*.

Table 6. The similarities regarding the main themes derived from Snellman's statement and the mission/vision parts of the websites of science centers in Africa

Region	Science Centers	Mission/Vision	Similarity/Code
Africa	Southern African Association of Science and Technology Centres (SAASTEC)	Mission: "To disseminate knowledge in science and technology to the public in general and the youth in particular through imaginative and enjoyable hands-on exhibits, displays and programmes, so that they can appreciate the relevance of science and technology in their daily lives" (Southern African Association of Science and Technology Centres [SAASTEC], 1973).	X1
		Vision: "To contribute to the improvement of life of Southern African nations by improving scientific knowledge and skills through the utilization of interactive living science and technology discovery centres (S&T centres)" (SAASTEC, 1973).	X6

According to Table 6, SAASTEC's *mission* (X1) and *vision* (X6) are similar to the basic themes derived from Snellman's statement (*Science for all, Human welfare*) in terms of *expression*. In other words, the X1 code is similar to the theme *Science for all*, and the X6 code is similar to the theme *Human welfare* in terms of *expression*.

3.1 Limitations of the Study

This study is limited to the documents and information published and shared in the about/mission/vision/goals/objectives parts of the websites of some science centers in various regions of the world, as presented in Science Center Networks (2019) (See SCN, 2019) and the statement made by Snellman, a Finnish philosopher-writer-diplomat, encouraging his people/everyone.

4. Discussion

According to Dostoyevsky, "*Man is a mystery and an unduly deep being*" (BirthdayWishes.expert, 2018; Dostoyevski, 2019, p. 51). This mystery, according to Socrates, means "*(Addressing Theaetetus), ...don't let on my secret to others!*" (Cornford, 2010, p. 43). He further states, this secret is "*the craft of midwifery*" (Cornford, 2010, p. 44); a craft or "*gaining skills without experience in a job goes far beyond the power of human nature*" (Cornford, 2010, p. 44). However, according to Osho, "*a river of life flows in the source of this mystery/this creature*" (Osho, 2016, p. 84). He adds, "*this river always changes at any time*" (Osho, 2016, p. 84). This change, according to Socrates, means the "*universe is actually a motion, nothing else*" (Cornford, 2010, p. 84). According to Carl Gustav Jung, "*this change should recognize the shadow of consciousness and anima/animus and understand well where the voices come from and where they direct it*" (Jung, 2016, p. 32). The shadow mentioned is, according to Nietzsche, "*thought is the shadow of emotions*" (Nietzsche, 2012, p. 120). According to Feridüddin Attar, this thought is "*leave the corrupt thoughts in your heart*" (Attar, 2016, p. 15). The shadow mentioned becomes original in this way. This originality, according to Nietzsche, is "*if man tightly ties up and enslaves his heart, he can give great freedom to his thought*" (Nietzsche, 2012, p. 121). This freedom, according to Socrates, is "*thought comes to the memory and becomes pregnant; as a result, it gives birth to a deceptive appearance or a thought capable of living and being true*" (Cornford, 2010, pp. 47-48). This thought capable of truth is, according to Bertrand Russell, "*the truth in science is only a moment*" (Demiralp, 2013, p. 29). This "*moment*" (Aristoteles, 2019, p. 195), according to Socrates, is "*in finding a definition of information, leave your memory to the will of your effort and enthusiasm, and prepare to find an answer*" (Cornford, 2010, p. 42).

According to George Berkeley, in this way/moment "*the scream of the whole is seen*" (Goodreads, 2019). Based on Francis Bacon's statement "*Try it, try it, don't believe anything without trying*", scientists make this scream experimentally visible" (Kearnes, 2008, p. 99; Bacon, 2019, p. 192). These people constantly experience transformative experiences. According to Arthur Schopenhauer, the people mentioned "*see what is universal*" (Schopenhauer, 2016, p. 169). This act of seeing continues for life. In this sight, transformative experiences come to the fore.

Therefore, "*Transformative experiences will be the most sold products in the future!*" (Madsen, 2017, p. 59). In the transformation pointed out, science centers are active. This activity, according to Madsen (2017) is "*Experimentarium visitors are welcomes to come into the science center with a lot of questions, but they must leave Experimentarium with even more questions because Experimentarium should make the visitor curious and interested in learning more about science and technology. In short, we must transform our visitors, so they become*

more curious and interested in learning more about science and technology.” (p. 59).

The transformation mentioned above has been highlighted in the studies conducted in several parts of the world. These highlights according to the ASDCy report are:

- There is significant evidence that interactive science exhibitions increase visitors’ knowledge and understanding of science”(ASDCy, n.d.).

In addition to above-mentioned points, science centers provide people from every age with the opportunities shown below and encourage curiosity. They are, according to ASTC:

- “Science centers encourage curiosity” (ASTC, 2019).

Apart from these, the duty of these modern science centers according to CIMUSET is “to contemporary science centres, working primarily to popularize and promote science and technology among children and young people all over the world.” (CIMUSET, n.d.).

It is important to know the physical, mental and emotional needs of children and young people to popularize and promote science and technology. Meeting identified mental needs is at the forefront of science centers. Contemporary science centers try to appease this hunger of children and young people, in other words, everyone. To appease this hunger, the fact that “*science is concrete, accessible and useful for all people*” (ASCN, 2019) is effective. These three qualities are provided in contemporary science centers. The first of these, that is, understanding knowledge, means, according to Socrates, “*knowledge and wisdom are the same thing*” (Cornford, 2010, p. 36). In this way, individuals from all ages who come to science centers with questions in their minds inquire about “*knowledge, one of the fundamental parts of the universe*” with their questions (Durer, 2016). This inquiry is repeated continuously in this environment. The product of this repetition, namely, inquiry, according to Mrs. Dalloway, “*comes through pain*” (cited, Aydın, 2017, pp. 24-127-153), and to Maxim Gorki “*comes from man*” (cited Aydın, 2017, p. 26). In these centers, they partly experience what scientists experience from this product and the “*mysterious and deep creatures*” from which this product emerges (BirthdayWishes.expert, 2018; Dostoyevski, 2019, p. 51), and they find answers to their questions. In this way, they to some extent understand the information and the source from which it has emerged. In other words, they understand that the information and the source from which it emerges are broad and great. According to Socrates, this broad and great understanding is “*they say knowing is having the possession of knowledge*” (Cornford, 2010, p. 245). The “they say” pointed out here is, according to Aristoteles (1985, p. 54), in the form of “*all people naturally want to know*”. This form “*shows how knowledge is vitally important*” (Keseroğlu, 2010, p. 686). This experience is active in contemporary science centers. This activity is in the form of “*The contribution of the studies carried out in science centers to developing positive attitudes towards science in general*” (Çığrik, 2016, p. 95). The contribution of this form is that these centers are “*an important element of extracurricular education*” (Çolakoğlu, 2017, p. 21). According to Socrates, “*Thought comes to memory and gains meaning*” (Cornford, 2010, pp. 47-48), while to Plato, this form is “*True thinking is knowledge*” (YourStory, 2017; Cevizci, 2010, p. 132; Platon, 2019, p. 38). The information indicated can be reached “*by matching the objected achievements in schools’ curricula with the experimental environments in science centers*” (Çolakoğlu, 2017, p. 21). For the achievement indicated, “*they should consciously play an important role in the spread of interdisciplinary science, technology, engineering, mathematics, and arts (STEAM) in the world and Turkey*” (Çolakoğlu, 2017, p. 22). In undertaking the above-mentioned role, Snellman’s basic themes encouraging his people/everyone (*Science for All, Science Centers for All, Human Welfare*) should be adopted as a guide.

5. Conclusion

This study aimed to show the similarities (*expression, emphasis, implication*) in the about/mission/vision/goals/objectives of the websites of science centers from around the world and the fundamental themes inferred from Snellman’s above-mentioned statement (*Science for all, Science Centers for all, Human welfare*) that was spoken to encourage/challenge his people/everyone. These similarities are: i) *expression* in ASTC, CIMUSET/CSTM, CASC, and SAASTEC, ii) *emphasis* in ECSITE, ASDC, ASCN, and NSCF, and iii) *implication* in ASPAC, ASTEN, NCSM, ABCMC, and Red-POP. It can be argued that the similarities and the guidance of the words that are the source of them will gain importance in the future. This importance, according to Madsen (2017, p. 59), is that “*the best-selling product in the future will be transformative experiences*”. Science centers are active in this transformation. According to Keller (1987), intrinsic motivators stand out in this activity. The force that drives these motivators, according to Thomas Carlyle, is “*The masses of people are like a pile of hay on the ground and decay. The great men, the heroes, are like a lightning bolt falling from the sky, igniting the hay, reviving and mobilizing the masses of people*” (Petrov, 2013, p. 21). Accordingly, the lightning of the Finnish people is Snellman, the Finnish

philosopher-writer-diplomat. Finnish people visited the temples of science and ideas mentioned above and returned with full of knowledge under his guidance. In other words, they have been ignited and have become visible today. In this visibility, self-realization is apparent. The temples mentioned above, in other words, cultural institutions “will help in the journey of self-realization” (Madsen, 2017, p. 68). This help, believes Madsen (2017), is

“Looking optimistically in the crystal ball, I see that humans will have more leisure time as robots take over more and more of our work. Now we have more time for ourselves and for self-realization like maybe only the Greeks of 400 BC had. And on this journey of self-realization, the Cultural Institutions will gladly help. Cultural institutions will be a larger part of human life” (p. 68).

In the continuity of this form, namely, self-realization, learning that occurs today stands out. This learning, as summarized by the National Association for Research in Science Teaching is: “Learning that occurs today depends on yesterday’s learning and is the foundation for tomorrow’s learning” (Ecsite UK, 2008, p. 15). Based on what was pointed out above, science museums and science centers come to the fore. The difference between them, according to Per-Edvin Persson, the Director of the Science Center of Finland, Heureka, “The difference between a science museum and a science centre is like a line drawn in water” (Ecsite UK, 2008, p. 2). It is clear from the statement highlighted above that traces of Snellman’s statement encouraging his people/everyone can be found in the about/mission/vision/goals/objectives of the websites of science centers from around the world in the form of expression, emphasis and implication, and that this statement has guided the science center of his country (Finland).

6. Suggestions

If we were to make an analogy in Turkish to this guide for the statement presented, it would be “Grass grows on its roots” (Türkçe Deyimler Sözlüğü, 2019). Here, “the grass” is the Finnish people and the “roots of the grass” is Snellman, the Finnish philosopher-writer-diplomat. The above-mentioned statement of this root is the fertilizer of the grass. This fertilizer, that is, the basic themes derived from Snellman’s statement encouraging his people/everyone, can be seen in the about/mission/vision/goals/objectives of the websites of “cultural institutions” (Madsen 2017, p. 68), science centers, which “are expected to play a big role” (Madsen 2017, p. 68) in “the global village” (Touraine, 2016, p. 121) of the future.

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Note.

Note 1. A part of this paper was presented orally at the 6th National Chemistry Education Congress (UKEK 2019) held at Hacettepe University, Faculty of Education on May 4, 2019.

Appendix A

Basic themes derived from Snellman's statement

What basic themes do you think can be derived when Johan Vilhelm Snellman's statement/message is analyzed scientifically?	<i>Go to temples of science and ideas of Europe. Imitate the Tugendbund, 'the Union of Virtue', of which thousands of German youth are members. Always keep the rule of "Fit soul is in fit body" in mind</i> (Petrov, 2013, p. 72)
	Basic themes:

Appendix B

Basic themes derived from Snellman's above-mentioned statement and the similarities/codes, in terms of expression/emphasis/implication, to the information presented in websites of various science centers around the world

		<i>Similarities/Codes</i>		
		<i>Expression (*X)</i>	<i>Emphasis (**Y)</i>	<i>Implication (***)Z)</i>
	Science For All	<i>X1 To disseminate knowledge in science and technology to the public in general and the youth in particular</i>	<i>Y1 people with science</i>	
			<i>Y2 citizens to engage with science</i>	<i>Z1 uma percepção da ciência</i>
	Science For All	<i>X2 At science centers, everyone is welcome</i>	<i>Y3 a society where people are intrigued, inspired and involved with the sciences</i>	<i>Z2 Participar en las toma de decisiones relacionados con la popularización de la ciencia</i>
			<i>Y4 Wissenschaft soll für alle Menschen begreifbar</i>	
Basic themes	Science Centers For All	<i>X3 to contemporary science centres, working primarily to popularize and promote science and technology among children and young people all over the world/</i>	<i>Y5 Wir setzen dafür sogenannte Science-Center-Aktivitäten ein, die Wissenschaften und Technik für die Öffentlichkeit auf leicht zugängliche Weise erlebbar machen</i>	
		<i>X4 Science Centres have relevance to all sectors of the population</i>	<i>Y6 is to bring together the science centres</i>	

		Z3.
		<i>the public understanding of science and technology</i>
		Z4.
		<i>human welfare</i>
	X5	Z5.
	<i>Prosperous</i>	<i>the benefit of students and for the common man</i>
Human	X6	Z6.
Welfare	<i>To contribute to the</i>	<i>To organize training programs for science</i>
	<i>improvement of life</i>	<i>teachers/students/young</i>
		<i>entrepreneurs/technicians/handicapped/housewives and</i>
		<i>others on specific subjects of science, technology and</i>
		<i>industry</i>

Similarities/Codes *X, **Y, ***Z

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